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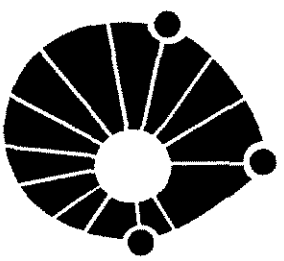

ROBERT CARVALHO DA SILVA
CIRURGIÃO DENTISTA

AVALIAÇÃO CLÍNICA DO TRATAMENTO DE RECESSÕES GENGIVAIS

Tese apresentada à Faculdade de Odontologia de Piracicaba - Unicamp, para obtenção do título de Mestre em Clínica Odontológica, Área de Periodontia.

PIRACICABA
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Orientador: Prof. Dr. Antonio Fernando Martorelli de Lima

Banca examinadora: Prof. Dr. Antônio Fernando Martorelli de Lima
Prof. Dr. Álvaro Francisco Bosco
Prof. Dr. Lauro Henrique de Souza Lins

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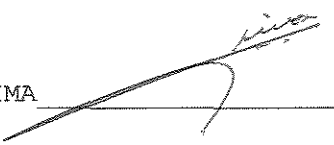
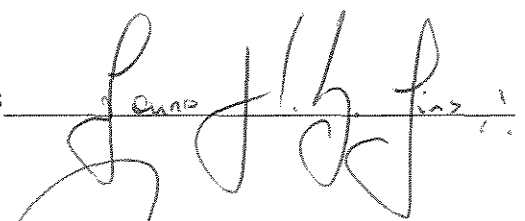
A Comissão Julgadora dos trabalhos de Defesa de Tese de MESTRADO, em sessão pública realizada em 29 de Novembro de 2002, considerou o candidato ROBERT CARVALHO DA SILVA aprovado.

1. Prof. Dr. ANTONIO FERNANDO MARTORELLI DE LIMA 

2. Prof. Dr. LAURO HENRIQUE SOUZA LINS 

3. Prof. Dr. ÁLVARO FRANCISCO BOSCO 

DEDICATÓRIA

Aos meus queridos pais,

Israel José da Silva e Maria Anízia de Carvalho Silva.

Meus referenciais de vida, alicerce, motivo, razão e inspiração de tudo que eu sou e um dia me tornarei: O meu amor, respeito e infinita gratidão pela sabedoria e simplicidade com que ensinaram a mim e aos meus irmãos através do exemplo de vida, de honestidade e amor familiar os preceitos da vida em sociedade.

Pai e Mãe, palavras não podem exprimir meu respeito e amor...

Mas saibam, obrigado!

Eu amo vocês

À minha família,

Roosevelt, **Robson**,**Rômulo** e **Ronald,** irmãos

Adriana, **Marly** e **Luciana,** cunhadas

Emilly e **Camily; Daniela**; **Ronald Jr.**, **Lucas** e **Thiago,** sobrinhos

Pela alegria de fazerem parte de minha vida

Robson e Ronald,

Obrigado por me permitirem esta jornada. Minhas conquistas são extensão fiel do sacrifício que vocês experimentaram, confiado na honestidade do meu ideal.

À minha metade,

Andrea,

que me inspira e ilumina com seu brilho intenso de amor e dedicação

e por estar do meu lado, e ao meu lado em todos os momentos,

mesmo à distância.

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SUMÁRIO

RESUMO

Este estudo avaliou o resultado do tratamento de recessões gengivais usando o retalho colocado coronal associado ou não ao enxerto subepitelial de tecido conjuntivo, grupos teste e controle, respectivamente. Os Índices dicotômicos de Placa (IPI) e Gengival (IG), e os parâmetros lineares Profundidade de Sondagem (PS), Nível da Margem Gengival (NMG), Nível Clínico de Inserção (NCI), Faixa de Tecido Queratinizado (TQ) e espessura gengival (Esp 1 e 2) foram obtidos imediatamente antes do procedimento cirúrgico e 6 meses após. Os Índices de Placa (IPI) e de Sangramento (IS) foram mantidos abaixo de 20% durante todo o período experimental. Os dados referentes aos parâmetros lineares foram avaliados pelo teste t pareado de Student para comparação entre os tempos e entre os grupos experimentais. Não houve diferença estatística significativa entre os grupos para nenhuma das variáveis no exame inicial ($p > 0,05$). No grupo teste, houve diferença estatística significativa ($p < 0,05$) para todos os parâmetros entre os tempos experimentais, enquanto que, no grupo controle, a diferença estatística significativa foi encontrada apenas nos parâmetros PS, NMG e NCI ($p < 0,05$). A comparação entre os grupos 6 meses após os procedimentos de recobrimento radicular mostrou diferença estatística entre os parâmetros TQ, Esp 1 e Esp 2 ($p < 0,05$), entretanto não houve diferença ($p > 0,05$) nos parâmetros PS, NMG e NCI. Ambas técnicas cirúrgicas foram eficientes para produzir recobrimento radicular. A aplicação clínica do retalho colocado coronal associado ao enxerto subepitelial de tecido conjuntivo foi mostrada em três situações clínicas diferentes associadas a

problemas estéticos e funcionais. Foram utilizadas diferentes formas de avanço coronário do retalho sobre o enxerto de tecido conjuntivo subepitelial que proporcionaram recobrimento completo da superfície radicular exposta com aumento significativo da faixa de gengiva queratinizada e espessura gengival. Esses resultados confirmaram que a associação do retalho colocado coronal e o enxerto de tecido conjuntivo subepitelial foi eficiente na resolução de problemas estéticos e funcionais.

Palavras-chave: recessão gengival/cirurgia, recessão gengival/enxerto, recessão gengival/tecido conjuntivo.

ABSTRACT

This study evaluated the results of the treatment of gingival recessions using the coronally positioned flap associated or not with the subepithelial connective tissue graft, test group and control group, respectively. The dichotomic Plaque Index (PII) and Gingival Index (GI), as well as the linear parameters Probing Depth (PD), Gingival Margin Level (GML), Clinical Attachment Level (CAL), width of keratinized Tissue (KT) and Gingival/mucosal Thickness (GT1 and GT2) were assessed at baseline and 6 months latter. Both Plaque Index (PII) and Gingival Index (GI) were maintained below 20% through all the experimental period. Data corresponding to the linear parameters were analyzed using Student *t* test for paired observations to assess changes obtained within and between groups. The results did not show significant statistical differences between groups for any of the parameters at baseline evaluation ($p > 0.05$). In the test group, there was significant statistical difference for all parameters between the evaluation periods ($p < 0.05$), however, in the control group, significant difference was found for PD, GML and CAL only ($p < 0,05$). The between-groups comparison 6 months postsurgery showed significant difference for KT, GT1 and GT2 ($p < 0,05$), however no significant difference was found for PD, GML and CAL ($p > 0,05$). Both approaches were effective to produce root coverage. The clinical application of the coronally positioned flap associated with the subepithelial connective tissue graft was shown in three different clinical situations associated with aesthetic and functional problems. Different forms of coronally advancing the flap over the subepithelial connective tissue graft were

used which provided complete root coverage and significant increase of keratinized tissue width as well as gingival thickness. These results confirmed that the coronally positioned flap was effective in the resolution of aesthetic and functional problems.

Key words: gingival recession/surgery, gingival recession/graft, gingival recession/connective tissue.

Introdução Geral

A estética, cada vez mais solicitada, envolve avaliações subjetivas influenciadas pela simetria e harmonia das estruturas. Em Odontologia, o resultado das intervenções deve alcançar a semelhança com as estruturas naturais (MORLEY, 1999, KOKICH, 1990). Essa solicitação imprimiu à Periodontia a necessidade de mudanças conceituais que cada vez mais desprezam a realização de procedimentos ressectivos para interromper a progressão da doença. Atualmente, as manobras terapêuticas empregadas devem produzir a normalidade do periodonto em condições de saúde e com estética aceitável (CAMARGO et al., 2001).

Uma das principais alterações estéticas relacionadas com a Periodontia é a recessão ou retração da margem gengival, definida como a posição apical da margem gengival em relação à junção cemento-esmalte (AAP, 1994). Além do comprometimento estético, as recessões podem predispor o indivíduo à hipersensibilidade dentinária e à cárie radicular (WENNSTRÖM, 1996). BAKER e SEYMOUR (1976) descreveram o mecanismo provável da patogênese das recessões gengivais. Segundo esses autores, a resposta inflamatória provoca a desorganização do tecido conjuntivo gengival e a projeção das cristas dos epitélios oral, sulcular e juncional. Na dependência da espessura do tecido conjuntivo, pode ocorrer a união dessas cristas epiteliais interferindo com a nutrição desses tecidos que acabam descamando. A evolução deste processo pode ser a manifestação clínica da recessão da margem gengival.

Evidências da literatura sugerem que o fator etiológico primário das recessões é a inflamação decorrente do acúmulo de biofilme bacteriano ou do trauma de escovação (LÖE, ANERUD e BOYSEN, 1992; VEKALAHTI, 1989). Entretanto, outros fatores podem favorecer a ocorrência da lesão, como o mal posicionamento dental (KÄLLESTAL e UHLIN, 1992), a presença de deiscências ósseas (LÖST, 1994), inserções musculares próximas à margem gengival (TROTT e LOVE, 1966) e procedimentos restauradores iatrogênicos (LINDHE e NYMAN, 1980) que podem favorecer o desenvolvimento da lesão.

Houve no passado muito debate quanto a extensão da faixa de gengiva inserida compatível com a saúde. A dimensão ápico-cervical da faixa inserida sugerida como ideal varia de entre 1,0 mm (BOWERS, 1963) até acima de 3,0 mm (CORN, 1962). Atualmente aceita-se que, independente da extensão, a faixa ideal de gengiva inserida é aquela que seja compatível com a saúde clínica (FRIEDMAN, 1962; de TREY e BERNIMOULIN, 1980).

Todos estes estudos, que avaliaram a relação entre a presença ou ausência de gengiva inserida e saúde gengival, consideraram somente os aspectos clínicos. Entretanto WENNSTRÖM e LINDHE em 1983 (a e b), realizaram estudos histomorfométricos em cães nos quais duas categorias gengivais puderam ser identificadas com relação a largura de gengiva inserida. Os autores demonstraram que independente da largura da faixa de gengiva inserida a extensão do infiltrado inflamatório era semelhante nos dois grupos. Além disso, o conceito de que o aumento da faixa de gengiva inserida após a realização de enxerto gengival livre pusesse impedir a perda de inserção conjuntiva foi contestada por DORFMAN,

KENNEDY e BIRD (1980), DORFMAN, KENNEDY e BIRD (1982) e FREEDMAN et al., (1992).

Segundo MILLER (1985) as lesões de recessão gengival são classificadas segundo a posição da margem gengival em relação à linha mucogengival e a altura do osso interproximal. Os defeitos classe I e II de Miller, que consideram a integridade do osso interproximal, podem ser adequadamente tratados por técnicas plásticas periodontais. Nessas situações, o osso interproximal assegura suporte e nutrição dos enxertos e retalhos e garante a manutenção e estabilidade da margem gengival próxima à junção cemento-esmalte.

Várias técnicas de recobrimento radicular são citadas para o tratamento das recessões gengivais. Genericamente, podem ser usados os enxertos livres, os retalhos pediculados ou avançados, a associação destes procedimentos e ainda manobras que buscam a regeneração do periodonto de sustentação sobre a superfície radicular. Retalhos pediculados são aqueles em que os tecidos gengivais adjacentes são reposicionados sobre a superfície radicular exposta, entretanto, a base do retalho é preservada. GRUPE e WARREN em1956, descreveram a técnica do retalho deslocado ou reposicionado lateral. Variações dessa técnica foram largamente utilizadas (PENNEL et al., 1965; COHEN e ROSS, 1968). Uma limitação da técnica é o risco de ocorrência de recessões nas áreas doadoras adjacentes (PFEIFER e HELLER, 1971).

O retalho colocado coronal (RESTREPO, 1973; ALLEN e MILLER, 1989) e sua principal variação, o retalho semilunar descrito por TARNOW em 1986, utilizam o deslocamento gengival em direção coronal. As limitações destas

técnicas são a dimensão da faixa de tecido queratinizado e a profundidade do vestíbulo (MILLER, 1994).

Os enxertos livres são colhidos em área distante do defeito, normalmente na região palatina entre o canino e primeiro molar e colocados sobre leito receptor previamente preparado. Existem duas variações básicas: o enxerto gengival livre composto do tecido conjuntivo acompanhado do epitélio de revestimento, e o enxerto de tecido conjuntivo subepitelial desprovido do epitélio que o recobre. A previsibilidade no tratamento das recessões gengivais quanto ao recobrimento radicular com a utilização do enxerto gengival livre foi afirmada por NABERS (1966), SULLIVAN e ATKINS (1968) e MILLER (1985), entretanto, o resultado final não é esteticamente aceitável pois a coloração tecidual tende a ser mais opaca que o remanescente vestibular (KARRING, LANG e LÖE, 1972). Atualmente a indicação mais precisa para o enxerto gengival livre é a criação de gengiva queratinizada em áreas nas quais a estética não é preocupante (MILLER, 1994). Segundo DORFMAN, KENNEDY e BIRD (1980), DORFMAN, KENNEDY e BIRD (1982) e FREEDMAN et al. (1992) o enxerto gengival livre é um meio eficiente para criar gengiva queratinizada sem evidências de benefícios sobre a saúde gengival.

O enxerto de tecido conjuntivo subepitelial que foi originalmente descrito para a correção de defeitos de rebordo (LANGER e CALAGNA, 1980), representa uma evolução que possibilitou a indicação da técnica para recobrimento radicular (LANGER e LANGER, 1985). A preparação do leito receptor usando retalho de espessura parcial cria ambiente bilaminar com suprimento sangüíneo ideal para o

enxerto a partir dos plexos supraperiosteal e da face interna do retalho. Esta técnica tem vantagens sobre as outras, uma vez que combina a estética favorável e a possibilidade de aumento da espessura gengival (WENNSTRÖM, 1996; MILLER, 1998).

O recobrimento radicular parece ser melhor alcançado com a associação das técnicas de retalho colocado coronal e enxerto subepitelial de tecido conjuntivo.

MILLER em 1987, propôs que o recobrimento radicular completo inclui i. margem gengival na altura da junção cemento - esmalte, ii. inserção clínica do tecido gengival à superfície radicular, iii. profundidade de sondagem que não exceda 2,0 mm e iiii. ausência de sangramento à sondagem.

Este estudo foi conduzido para avaliar o tratamento das recessões gengivais classe I de Miller comparando o retalho colocado coronal associado ou não ao enxerto de tecido conjuntivo subepitelial. Como segundo objetivo este estudo avaliou a aplicabilidade das técnicas combinadas em diferentes situações clínicas relacionadas com problemas estéticos e funcionais.

CAPÍTULO 1

Trabalho submetido ao The Journal of Periodontology em 29/10/2002.

Root coverage using the coronally positioned flap associated or not with the subepithelial connective tissue graft *

Robert Carvalho da Silva

Antonio Fernando Martorelli de Lima

ABSTRACT

Background: Various surgical techniques have been proposed for the treatment of gingival recession. This randomized clinical trial compared the coronally positioned flap (CPF) alone or in conjunction with a subepithelial connective tissue graft (SCTG) in the treatment of gingival recession.

Methods: Eleven non-smoker subjects with bilateral and comparable Miller Class I recession defects were selected. The defects, at least 3.0 mm deep, were randomly assigned into test group (CPF+SCTG) or control group (CPF alone). Recession depth (RD), probing depth (PD), clinical attachment level (CAL), width of keratinized tissue (KT) and gingival/mucosal thickness (GT) were assessed at baseline and 6 months postoperatively.

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Results: RD was significantly reduced 6 months postoperatively ($p < 0.05$) for both groups. Mean root coverage was 75% and 69% in the test and control group, respectively. There were no significant differences between the 2 groups in RD, PD, and CAL, either at baseline or 6 months postoperatively. However, 6 months postoperatively the test group had a statistically significant increase in KT and GT compared to the control group ($p < 0.05$).

Conclusion: The results indicate that both surgical approaches are effective in addressing root coverage. However, when increase in gingival dimensions (keratinized tissue width, gingival/mucosal thickness) is a desired outcome, then the combined technique (CPF+SCTG) should be used.

Key words: gingival recession/therapy, coronally positioned flap, connective tissue graft.

Introduction

Periodontal plastic surgery is defined as surgical procedures performed to prevent, correct or eliminate anatomic, developmental or traumatic deformities of the gingiva, or alveolar mucosa.[1] One of the most common indications for periodontal plastic surgery is the treatment of gingival recession, i.e., the apical shift of the gingival margin in relation of the cemento-enamel junction.[2]

Several surgical approaches have been used to achieve root coverage. Among them, the coronally positioned flap (CPF)[3-5] and the subepithelial connective tissue graft (SCTG)[6-8] with several variants[9-11] are among the most widely used techniques to treat recession defects. Although many comparisons have been made using different surgical approaches,[12] the literature is lacking in studies directly comparing the CPF and SCTG techniques.

The objective of this randomized clinical trial was to compare the outcome of gingival recession therapy using CPF alone or in conjunction with a SCTG in a split-mouth design.

Material and Methods

Patient selection and experimental design

Eleven subjects, 6 males and 5 females, aged 18-43 years, were recruited. Table 1 includes demographic details. All participants met the study inclusion criteria: bilateral Miller's class I recession defects (≥ 3 mm in depth) involving maxillary canine or premolar teeth (recession depth difference between left and right defect ≤ 2 mm), presence of identifiable cemento-enamel junction (CEJ), periodontally

healthy, no occlusal interferences, systemically healthy, no contra-indications for periodontal surgery, no medications known to interfere with periodontal tissue health or healing. Recession defects associated with caries or restorations, as well as teeth with evidence of pulpal pathology were excluded.

The subjects were selected from patients referred for regular dental treatment at the School of Dentistry at Piracicaba, University of Campinas, Brazil. Informed consent was signed by each of the subjects after thorough explanation of the nature, risks and benefits of this clinical investigation and associated procedures. The University's Ethical Committee approved the consent form and experimental protocol.

The study protocol involved a screening appointment, to verify eligibility, followed by initial therapy to establish optimal plaque control and gingival health conditions, surgical therapy and postoperative evaluation 6 months later. Gingival Bleeding Index (GBI) and Visible Plaque Index (VPI)[13] were used to assure gingival health conditions during the study.

Randomization

Bilateral defects were randomly assigned by coin toss into test group, treated by CPF+SCTG, and control group, treated by CPF (Table 1). Randomization of defects took place at the surgical appointment.

Table 1: Demographic data of study participants and defect allocation.

Patient #	Gender	Age	Tooth number	
			CPF	CPF+SCTG
1	F	18	11	6
2	M	27	12	5
3	M	33	6	11
4	F	32	12	5
5	M	23	12	5
6	M	27	5	12
7	M	36	12	4
8	M	43	5	12
9	F	28	11	5
10	F	31	11	6
11	F	23	11	5
Mean		29.2		

CPF: coronally positioned flap.

CPF+SCTG: coronally positioned flap with subepithelial connective tissue graft.

Clinical parameters

The following clinical parameters were assessed at baseline and 6 months after surgery on the midbuccal aspect of the study teeth:

- recession depth (RD), measured as the distance from the cemento-enamel junction (CEJ) to the gingival margin (GM),
- probing depth (PD), measured as the distance from GM to the bottom of the gingival sulcus,
- clinical attachment level (CAL), measured as the distance from the CEJ to the bottom of the sulcus,

- the apico-coronal width of keratinized tissue (KT), measured as the distance from the mucogingival junction (MGJ) to the GM, with the MGJ location determined using a visual method.[14]
- thickness of gingival/mucosal tissue (GT). GT was assessed at 2 different positions: a) GT1: at the middle of the apico-coronal width of the keratinized tissue, and b) GT2: 2 mm apical to the MGJ. One endodontic finger spreader associated to a rubber stopper was perpendicularly inserted in the gingival tissue, and the thickness reading was determined with a caliper ‡ to the nearest 0.1 mm.

The Florida Probe™ † system was used to assess RD, PD, CAL and KT, to the nearest 0.2 mm. A custom stent was used for probe positioning.

The percentage of root coverage was calculated after 6 months according to the following formula:

$$\frac{\text{(Preoperative RD)} - \text{(Postoperative RD)}}{\text{(Preoperative RD)}} \times 100$$

Initial therapy

The initial periodontal therapy consisted of oral hygiene instructions, ultrasonic instrumentation, and coronal polishing 1-2 months prior to the surgical appointment. Restorative treatment needs in non-study teeth were also addressed.

‡ Mitutoyo, Mitutoyo America Co, Aurora, IL, USA.
† Florida Probe, Gainesville, FL, USA.

Immediately prior to baseline, alginate impression of the maxilla was obtained and casts were made. Casts were used for fabrication of custom acrylic stents. Stents were used during clinical parameter assessment to assure reproducibility of probe position and angulation between appointments, and not as reference point for the clinical measurements.

Surgical procedures

For analgesia and postoperative edema control, each patient was given a single dose of 4 mg betamethasone [§] and 750 mg acetaminophen [‖] 1 hour prior to surgery. Anxious patients were also given 5 mg Diazepan [¶].

Extraoral antisepsis was performed with a 2.0% chlorhexidine solution[#] and intraoral with 0.12% chlorhexidine rinse[#]. Anesthesia was achieved with lidocaine 2.0% with 1:100.000 epinephrine[**].

Root surfaces were thoroughly instrumented with manual scalers to achieve a flattened surface. For control sites (Figure 1) the flap design started with an intrasulcular incision at the vestibular aspect of the involved teeth and extended horizontally to the center of the interdental gingiva, at CEJ level, mesial and distal to the defects. Two oblique, apically divergent relaxing incisions, extending beyond the MGJ, completed the flap design. The trapezoidal split-thickness flap was

---

§ Celestone ® - Schering - Plough Ind. Quím. e Farm. S/A, Rio de Janeiro, RJ, Brazil.

‖ Tylenol ® - Cilag Farmacêutica Ltda., São Paulo, SP, Brazil.

¶ Valium ® - Roche Produtos Quím. e Farm. S/A, São Paulo, SP, Brazil.

Proderma Farmácia de Manipulação Ltda, Piracicaba, SP, Brazil.

** Lidocaína – Alphacaina, Adrenalina 1:100.000, DFL Ind. E Com. Ltda, Rio de Janeiro, RJ, Brazil.

elevated with sharp dissection, and extended as far as necessary to allow for flap advancement to the CEJ without tension. The vestibular epithelium of the interdental papillae was removed to provide a proper wound bed for healing (Figure 2). Finally, the flap was positioned at the level of or slightly coronal to the CEJ and fixed with mattress sutures while interrupted sutures[‡‡] were placed at the vertical incisions (Figure 3). Abundant saline irrigation was performed during the procedures.

For test sites (Figure 5), the procedure was identical to the one described above, except for the addition of a CT graft (Figure 6). A CT graft in the proper dimensions was harvested from the palate (premolar area) using the trap door approach.[7] The CT graft was trimmed as necessary to remove visible epithelium. Graft dimensions were determined by the distance between the vertical incisions, and by the distance from CEJ to 4.0 mm apical to the buccal bone crest. Graft thickness was measured just after harvesting using a needle associated to an endodontic rubber stopper and a caliper to the nearest 0.1 mm. Average graft thickness was 1.3 mm (data not shown).

The CT graft was placed at the CEJ level in a vertical orientation covering entirely the defect and adjacent recipient bed. An "x" shaped sling absorbable suture[††] was used to hold the graft in place, anchoring the periosteum apical to the graft and tied on the palatal aspect of the tooth (Fig. 6). However, the suture did

‡‡ 6-0 Nylon monofilament, Ethicon, Johnson & Johnson Prod. Prof. Ltda, São José dos Campos, SP, Brazil.
†† 6-0 Poliglactina 910 vicryl, Ethicon, Johnson & Johnson Prod. Prof. Ltda, São José dos Campos, SP, Brazil.

not penetrate the graft. The flap was positioned at the level of or slightly coronal to the CEJ and fixed with mattress sutures while interrupted sutures[‡‡] were placed at the vertical incisions (Figure 7).

Both surgical procedures were performed at the same appointment. No periodontal dressing was used.

‡‡ 6-0 Nylon monofilament, Ethicon, Johnson & Johnson Prod. Prof. Ltda, São José dos Campos, SP, Brazil.

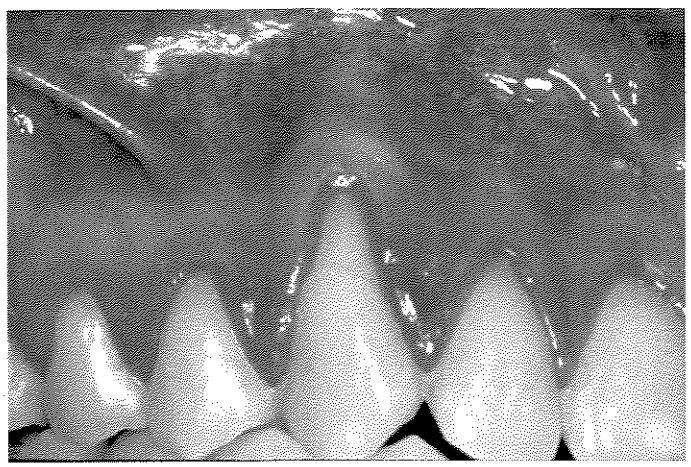

Figure 1: Recession defect test group

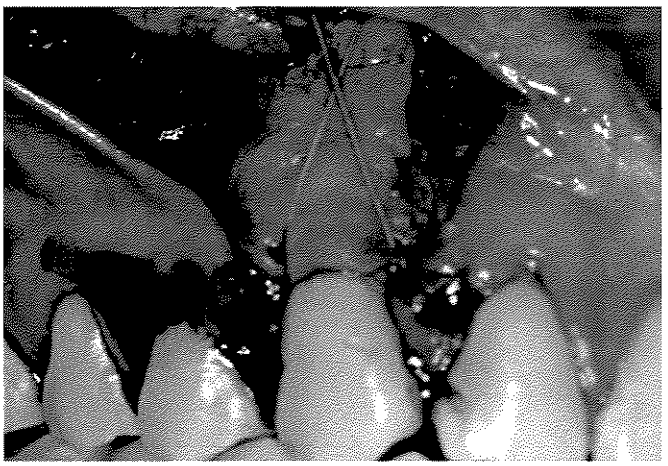

Figure 2: SCTG sutured in a vertical orientation

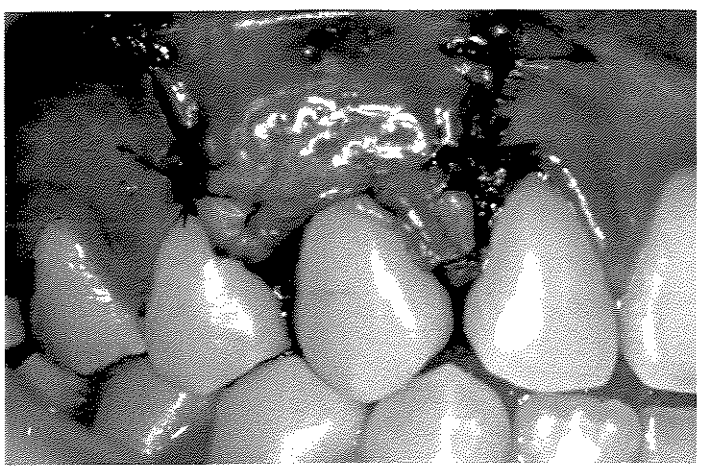

Figure 3: Coronally positioned flap over the SCTG

Figure 4: Six months follow-up

Figure 5: Recession defect control group

Figure 6: Split-thickness trapezoidal flap

Figure 7: Coronally positioned flap

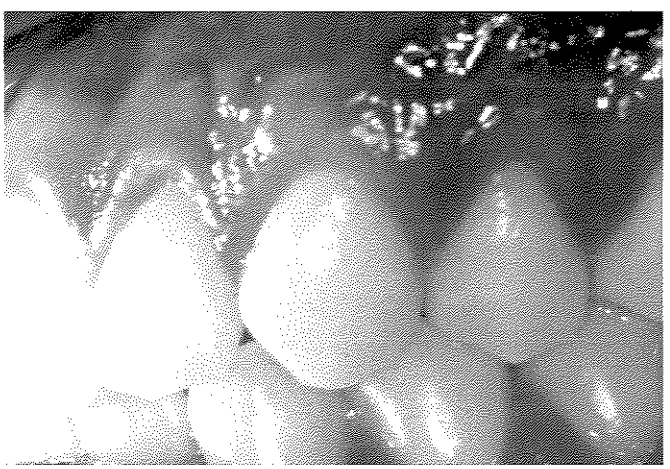

Figure 8: Six months follow-up

Postoperative protocol

Subjects were prescribed analgesics (acetaminophen[II] 750 mg qid) for 2 days and twice

daily 0.12% chlorhexidine rinse[#] for 4 weeks. Subjects were instructed to abstain from brushing and flossing the maxillary teeth until suture removal (14 days), and to consume only soft foods during the first week. They were also instructed to avoid any other mechanical trauma to the treated sites.

Subjects were enrolled in a supportive periodontal therapy program (professional plaque control), weekly for the first 4 weeks and then monthly until the end of the study period.

Statistical analysis

Descriptive statistics were expressed as mean ± standard deviation (S.D). Data were analyzed using Student's *t* test for paired observations to assess changes obtained within and between groups. The significance level for rejection of the null hypothesis was set at alpha = 0.05.

Results

All patients tolerated the surgical procedures well, experienced no postoperative complications, and complied with the study protocol. Full mouth GBI and VPI were

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[II] Tylenol [®] - Cilag Farmacêutica Ltda., São Paulo, SP, Brazil.

[#] Proderma Farmácia de Manipulação Ltda, Piracicaba, SP, Brazil.

kept below 20%. The teeth of interest were free of plaque and gingival inflammation prior to surgery, during and at the end of the study.

The descriptive statistics for the clinical parameters at baseline and after 6 months, for both groups, as well as the mean differences within and between groups are presented in Table 2.

At baseline, no statistically significant differences were found between the 2 groups for any of the parameters evaluated.

In the control (CPF) group, statistically significant changes from baseline were found for RD, PD, and CAL. RD decreased by 2.73 $\pm$ 0.99 mm (mean $\pm$ SD), which represents average root coverage of 68.8%. Complete root coverage was achieved in only 1 of 11 defects. PD increased by 0.42 $\pm$ 0.43 mm, while CAL decreased by 2.30 $\pm$ 1.05 mm.

In the test (CPF+SCTG) group, statistically significant changes from baseline were found for all parameters. RD decreased by 3.16 $\pm$ 0.86 mm (mean $\pm$ SD), which represents average root coverage of 75.3%. Complete root coverage was achieved in 2 of 11 defects. PD increased by 0.55 $\pm$ 0.54 mm, while CAL decreased by 2.53 $\pm$ 1.14 mm. KT increased from 2.79 $\pm$ 0.93 to 3.35 $\pm$ 0.71 mm, GT1 increased from 1.34 $\pm$ 0.28 to 1.78 $\pm$ 0.29 mm, and GT2 increased from 1.15 $\pm$ 0.28 to 1.96 $\pm$ 0.37.

In the intergroup comparison at 6 months, statistically significant differences were found between control and test groups only for KT, GT1 and GT2 (Table 2).

Table 2: Clinical parameters (mean ± S.D.) at baseline and 6 months postoperatively.

Treatment	CPF	CPF+SCTG	Difference (CPF+SCTG – CPF)
RD			
Baseline	3.98 ± 0.62	4.20 ± 0.78	0.22 ± 0.82
6 months	1.25 ± 0.70	1.04 ± 0.67	-0.22 ± 0.85
Difference (Baseline-6 months)	2.73 ± 0.99 **	3.16 ± 0.86 **	0.44 ± 0.89
PD			
Baseline	1.47 ± 0.45	1.49 ± 0.35	0.02 ± 0.48
6 months	1.89 ± 0.45	2.04 ± 0.51	0.14 ± 0.54
Difference (Baseline-6 months)	-0.42 ± 0.43 **	-0.55 ± 0.54 **	-0.13 ± 0.72
CAL			
Baseline	5.45 ± 0.76	5.60 ± 0.95	0.14 ± 0.92
6 months	3.15 ± 0.99	3.07 ± 0.96	-0.08 ± 1.00
Difference (Baseline-6 months)	2.30 ± 1.05 **	2.53 ± 1.14 **	0.32 ± 1.25
KT			
Baseline	3.38 ± 1.53	2.79 ± 0.93	-0.59 ± 1.37
6 months	3.17 ± 1.23	3.35 ± 0.71	0.17 ± 0.77
Difference (Baseline-6 months)	0.21 ± 0.63	-0.55 ± 0.91 **	-0.76 ± 0.96 ##
GT1			
Baseline	1.27 ± 0.29	1.34 ± 0.28	0.07 ± 0.31
6 months	1.28 ± 0.22	1.78 ± 0.29	0.50 ± 0.23
Difference (Baseline-6 months)	-0.01 ± 0.32	-0.44 ± 0.37 **	0.43 ± 0.38 ##
GT2			
Baseline	1.08 ± 0.27	1.15 ± 0.28	0.07 ± 0.29
6 months	1.30 ± 0.34	1.96 ± 0.37	0.66 ± 0.37
Difference (Baseline-6 months)	-0.22 ± 0.49	-0.81 ± 0.42 **	-0.59 ± 0.44 ##

** Within-groups comparison ($p < 0.05$). # # Between-groups comparison ($p < 0.05$). All other within- and between-groups comparisons were non significant ($p > 0.05$).

CPF: coronally positioned flap; CPF+SCTG: coronally positioned flap with subepithelial connective tissue graft; RD: recession depth; PD: probing depth; CAL: clinical attachment level; KT: keratinized tissue width; GT1: mucogingival thickness 1; GT2: mucogingival thickness 2 (see text for details).

Discussion

The objective of this split-mouth, randomized, controlled clinical trial was to compare the coronally positioned flap alone (CPF) or in combination with the subepithelial connective tissue graft (CPF+SCTG) in terms of recession resolution. Considering the study design and the groups' homogeneity at baseline, differences in clinical outcomes can be attributed to the treatments employed.

In the present study, both groups experienced improved clinical outcomes in terms of root coverage and gain in CAL without statistically significant difference between groups (Figures 4 and 8). There was a statistically significant increase in PD for both groups, not considered clinically significant, since PD did not exceed 3 mm at any site and there was no bleeding on probing or other sign of inflammation.

However, the results for KT, GT1 and GT2 demonstrated significant differences between the groups. In the test group (CPF+SCTG) there was a statistically significant increase in KT, GT1 and GT2, while in the control group (CPF) there were non-significant changes in KT (decrease) and GT (increase).

The percent root coverage results obtained in the present study, 69% for CPF and 75% for CPF+SCTG, fall within the ranges of other reports.[12,16] In reports of studies of at least 6 months duration with a minimum of 10 patients per group,[16] the range of defect resolution in sites treated with CPF is 55-98% (mean 77%), while for CPF+SCTG treated sites the range is 52-99% (mean 82%). However, when reviewing the same studies, the present results appear to fall short when complete root coverage is considered (1 and 2 of 11 defects, for CPF and CPF+SCTG, respectively). In the aforementioned studies, complete root coverage

is achieved, on average, 45% of the time (range: 9% to 84%) for CPF treated sites, and 56% of the time (range: 50% to 88%) for CPF+SCTG treated sites.[16] The variance can be accounted for by differences in defect severity, surgical protocol and other factors.

The CPF design used in this study was according to the one described by Allen & Miller,[3] who treated 31 Class I defects in 28 subjects using this procedure. They reported 98% mean root coverage, with complete root coverage in 84% of the defects. However, the recession defects treated by Allen and Miller (mean RD = 3.25 mm; no defect > 4.0 mm) were shallower than the ones treated in the present study, a factor that could account for the difference in outcomes.

Raetzke[6] and Langer & Langer[7] proposed the use of the SCTG to improve the predictability of root coverage procedures, and the technique has been widely used, with many modifications of the original surgical approaches.[8-11,17] The bilaminar blood supply from the overlying gingival flap and the underlying periosteum promotes the high survival potential of the SCTG. In most, if not all, SCTG studies, the graft is positioned in a horizontal orientation. The graft is fixed over the denuded root surface with proximal sutures. In the present study, the graft was positioned in a vertical orientation to evaluate effects on mucogingival thickness and KT dimensions. Graft immobilization was carried out with a sling suture anchoring the periosteum apical to the graft and tied on the palatal aspect of the tooth. The suture did not penetrate either the graft or the interdental papillae. Although the clinical impression at surgery time was that the graft was immobile before flap advancement, it cannot be excluded that the graft was subsequently

dislodged, perhaps due to periosteum breakdown during early healing. Potential graft movement might have negatively impacted the results.

Despite the popularity of both the CPF[3-5,12,16] and the SCTG[6-12,16] techniques for root coverage, the literature is lacking in studies that directly compare the two techniques. The present study appears to be the first one to compare the two approaches in a split mouth design. Wennström & Zucchelli[18] reported the only other study that directly compared the two techniques in a parallel group design. The results of the two studies are in agreement, i.e., for Miller class I recession defects, equal to or greater than 3 mm in depth, there is no difference in root coverage outcomes between CPF and CPF+SCTG.

Wennström & Zucchelli[18] examined 45 defects treated by CPF (control sites) and 58 defects treated with CPF+SCTG (test sites), with 4mm average RD for both groups. At 6 months, mean root coverage was 96% in both control and test sites, while complete root coverage was observed in 74% of the control defects and 72% of the test teeth.[18] Comparison with the results of the present study (mean root coverage: 69% for CPF and 75% for CPF+SCTG) suggests that there must be factors responsible for the quantitative differences in outcome. Although the present study used similar surgical approaches for the treatment of recession defects apparently equal in severity to the defects treated by Wennström and Zucchelli,[18] there are differences between the two studies. In contrast to the present study, in the aforementioned study[18] multiple sites were treated per subject, the majority of defects were in canines and incisors (56% of maxillary defects), root surfaces were not heavily instrumented, the graft was secured in a

coronal position, a surgical dressing was used for the first 8 days of healing, and patients were instructed to use a roll technique for brushing. To what extent any of these differences may have contributed to the less successful outcome in the present study is a matter of speculation. As in other studies employing the CPF+SCTG combination,[17-21] there was a small increase in KT (0.55 $\pm$ 0.91 mm) postoperatively in this study. Because of the surgical approach employed, i.e., graft placed longitudinally to cover entire denuded root surface and completely covered by split thickness CPF (Fig.5-7), we can conclude that the grafted palatal tissue fails to induce transformation of the overlying alveolar mucosa, at least for the first 6 months postoperatively. This is in agreement with previous studies.[11,19-21] Use of CPF alone for root coverage resulted practically in no KT changes, a result consistent with published reports.[5,22]

The results presented here indicate that use of SCTG results in statistically significant increases in gingival and alveolar mucosal thickness (GT). The present results (GT increase by 0.44 to 0.81 mm, dependent on location) are consistent with the SCTG findings of Müller and coworkers,[23,24] who reported 0.56[23] to 0.77[24] mm increase in gingival thickness 6 months postoperatively. Similarly, the baseline GT values reported here are consistent with earlier reports on gingival thickness.[23,25,26] In the present study, the average harvested graft thickness was 1.3 mm (data not shown), which, in conjunction with the GT results, leads us to conclude that SCTG undergoes significant thickness reduction during healing.

To what extent the statistically significant increase in GT has any clinical significance is dependent on the clinical question asked. If the question is whether

it leads to better root coverage outcomes, the conclusion from the present and published studies[18] has to be negative. This is in contrast to evidence that preexisting flap thickness can affect root coverage outcome for CPF.[27] If the question is whether it makes the treated sites less susceptible to future recession, only the results of long-term follow-up studies will provide the answer. However, on the basis of the reported susceptibility of "thin" gingival biotypes to recession,[28,29] and assuming long term stability[30] of the surgical outcome (in terms of GT increase), one might speculate that the answer is a positive one.

In conclusion, the present study demonstrated that both CPF and CPF+SCTG are effective in providing root coverage in Miller class I gingival recession defects greater than 3 mm, although the combined technique should be preferred if increases in gingival dimensions (keratinized tissue width, gingival/mucosal thickness) are a desired outcome.

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CAPÍTULO 2

Trabalho submetido ao The Journal of Periodontology em 29/10/2002.

Coronally positioned flap associated with the subepithelial connective tissue graft for root coverage in different clinical situations *

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Antonio Fernando Martorelli de Lima

Background: One of the main objectives of the plastic periodontal surgeries is the treatment of gingival recessions due to aesthetic concerns as well as functional problems. The subepithelial connective tissue graft associated with the coronary positioned flap is one of the most widely required approach to deal with this issue. The present study discusses the applicability of the technique addressing root coverage.

Methods: Three different clinical situations are presented in which esthetic and functional problems were treated by means of root coverage. The subepithelial connective tissue graft was associated with different forms of advanced flaps.

Results: The subepithelial connective tissue graft provided aesthetic and functional resolution and complete root coverage. The technique evoked increased

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width and thickness of the gingival tissues, probing depths not exceeding 2.0 mm and no signs of gingival inflammation.

Conclusion: The clinical outcome using the coronally positioned flap associated with the subepithelial connective tissue graft is predictable and effective to deal with aesthetic and functional problems.

Key words: gingival recession/surgery, gingival recession/graft, gingival recession/connective tissue.

INTRODUCTION

Gingival recession has been defined as the apical displacement of the gingival margin in relation to the cemento-enamel junction.[1] Root exposure is of great concern due to esthetics complaints as well as the possibility of root caries and abrasion lesions, chemical erosion and thermal/tactile sensitivity.[2,3,4]

The etiology of gingival recessions includes inflammation that can be induced by bacterial plaque accumulation or by the mechanical action of aggressive tooth brushing.[5,6] According to Baker & Seymour[7], the possible pathogenesis of gingival recession is related to the growth and anastomosis of rete pegs of the oral and sulcular epithelium, as well as the epithelium lining the junctional or periodontal pockets epithelium. As the inflammation persists the rete pegs union leads to the formation of an interconnecting cord of epithelium. Inflammation destroys of the connective tissue from the gingival tissues and reduces the blood supply for epithelium that desquamates resulting in gingival clefts progressing to the manifestation of the recessions. The pathway of connective destruction is determined by the etiology of inflammation; i.e., when the inflammation is caused by plaque the connective destruction occurs from the sulcular/junctional basal membrane in direction to outside, and when induced by traumatic tooth brushing, the destruction pathway is the opposite.[8]

Other factors related to the occurrence of recessions includes lack of adequate vestibular depth and frenum pull[9], presence of thin alveolar plates such as observed in areas of osseous dehiscences or fenestrations[10], malaligned teeth[11,12], large teeth that are prominent in the arch[12], and iatrogenic factors such

as improper restorations[13,14] or uncontrolled orthodontic forces in which the movement results in the displacement of the teeth out of the envelope of the alveolar process[15,16,17].

Another important factor that predispose an area to gingival recession is the narrow apico-coronal dimension of the gingival tissue and decreased buccolingual thickness of the attached gingiva, particularly where thin gingival tissue is combined with the absence of the alveolar plate.[18]

Sullivan & Atkins[19] were the first to classify the gingival recessions, based on the depth and width of the defect. Four categories of defects were described: deep wide, shallow wide, deep narrow and shallow narrow. Later, Miller[20] proposed a classification based on the height of the interproximal papillae adjacent to the defect area, and the relation of the gingival margin and the mucogingival junction (MGJ). Four categories were described: Class I- marginal tissue recession not extending to the MGJ. No loss of interdental bone or soft tissue; Class II- marginal recession extending to or beyond the MGJ. No loss of interdental bone or soft tissue; Class III- marginal recession extending to or beyond the MGJ. Loss of interdental bone or soft tissue apical to the cementoenamel junction (CEJ) but coronal to the level of the recession defect; Class IV- marginal recession extending to or beyond the MGJ. Loss of interdental bone or soft tissue apical to level of the recession defect.

In the last decades, several techniques approached root coverage in isolated or multiple sites. Generally, it is used sliding flaps, epithelialized and de-epithelialized free grafts, and the combination of these procedures. More recently,

the acellular dermal matrix[21-24], the principles of guided tissue regeneration[3,25-27], and the enamel matrix derivative proteins[28] has also been advocated to promote root coverage. Root conditioning[29-32] and fibrin glue[31] has also been suggested, but seems not to yell any clinical improvement over conventional techniques.

The sliding flaps rely on adjacent gingival tissue to be advanced laterally[33-38] or coronally[29-31,39-42] Factors such as the fornix depth, the amount of keratinized gingiva adjacent to the defect, secondary frenal attachment at the donor site, multiple adjacent defects and the need of relative gingival thickness may limit these techniques.[43]

The epithelialized free gingival graft can be used in two different ways. First, the direct approach[44] in which a recipient bed is prepared with sharp dissection around the defect. A thick free gingival graft is harvested from the palate and trimmed to fit on the recipient bed covering completely the denuded root surface. Second, the indirect approach[45,46] in which the free gingival graft is performed previously without the intention of root coverage and after healing a second-stage coronally positioned flap is accomplished. However, inconsistent color blending with adjacent tissues, increased discomfort and potential of postoperative bleeding limits the use of this technique.[47,48] Nowadays, the most important indication for this procedure is the creation or augmentation of the keratinized gingiva zone, in areas where esthetics is not a concern.[43]

The subepithelial connective tissue graft (SCTG) was first introduced to correct ridge deformities.[49] Later the technique evolved to promote root coverage and has been regarded as the gold standard approach for dealing with root

recession.[50] Several technical variants have been proposed to cover the SCTG[51-53], however, the coronally positioned flap is the most widely used.[54-59]

The treatment of gingival recessions are required for a variety of reasons. However, the clinical decision of the treatment of choice is not a simple issue. It is recognized that areas with recession defects may be free of inflammation and remain stable with no progression for extended time. In these cases the rationale for root coverage relies on the patients' personnel beliefs of aesthetics, and to prevent/treat root hypersensitivity, caries or cervical root abrasion without necessarily treating a mucogingival problem. A mucogingival problem is characterized as the presence of inflammation in the gingival margin of the recession in areas with little or no attached gingiva.[48] Generally, in those cases without mucogingival problems the treatment of choice might be some kind of advanced flap without the need of harvesting connective tissue graft, whereas the defects associated with mucogingival problems and regarding esthetics the use of SCTG associated with advanced flaps would be the treatment of choice.[41]

Furthermore, the defect characteristics should be regarded before treatment. The defect dimensions, namely the size and width of the osseous dehiscence, root projection in the vestibular direction and mucogingival thickness can interfere with the final clinical outcome.[60,61] However, the most important aspect to be highlighted is the interproximal bone height.

Miller[20] stated that in the absence of interproximal bone there is no reliable source of blood supply for the graft to survive. Therefore, root coverage using or not free soft tissue grafts can only be expected at the level of the adjacent

interproximal tissue. Considering the growing esthetics concerns and the presence of gingival problems, we can assume that the root coverage techniques that approaches coronally advanced flaps associated with SCTG are the most reliable in recent days. It is not the scope of this manuscript to discuss the use of other techniques to promote root coverage. Rather, the purpose of this serial cases presentation was to discuss the applicability of coronally positioned flap associated with the subepithelial connective tissue graft addressing root coverage in different clinical situations.

CASE REPORTS

All patients sought for treatment at Piracicaba Dental School and were healthy and non-smokers. Subjects received initial periodontal treatment at least two weeks before the surgical procedure to eliminate signs of inflammation. Oral hygiene instructions were thoroughly explained individually to each subject about the appropriate usage of the toothbrush and dental floss. Following, root instrumentation was accomplished using either manual or ultrasonic devices. One hour before surgery, to avoid postoperative pain and swelling, each patient was prescribed a single dose of 4 mg Betamethasone [†] and 750 mg Acetaminophen [‡].

Additionally, for those very anxious patients Diazepam [§] (5 mg) was also given.

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† Celestone ® - Schering - Plough Ind. Quím. e Farm. S/A, Rio de Janeiro, RJ, Brazil.

‡ Tylenol ® - Cilag Farmacêutica Ltda., São Paulo, SP, Brazil.

§ Valium ® - Roche Produtos Quím. e Farm. S/A, São Paulo, SP, Brazil.

The extra oral antisepsis was done with a 2.0% chlorhexidine solution [II] and the intra oral with 0.12% chlorhexidine rinse [II] for one minute. Local infiltration with lidocaine 2.0% with 1:100.000 epinephrine [¶] was used for anesthesia. Surgery was only done when the full mouth plaque index and gingival index were less than 20%.

For postoperative control 750 mg Acetaminophen was prescribed as necessary, all subjects were instructed to rinse with 0.12% chlorhexidine digluconate solution for one minute and clean the wound area with a cotton pellet soaked in 0.12% chlorhexidine twice daily for four weeks. No periodontal dressing was used in donor and recipient sites. Subjects were also instructed to discontinue toothbrushing, flossing and avoid trauma in the surgical sites until suture removal (14 days). The patients were seen for professional plaque control weekly for the first 4 weeks and then monthly for tree months.

SITUATION NUMBER ONE

A 26-year old female presented with localized gingival recessions at tooth number 31 associated with frenum pull, no attached gingiva and inflammation. Figure 1 depicts a wide defect 4.0 mm deep measured using a UNC 15 periodontal probe [#].

The treatment of choice was the frenectomy followed by the coronally positioned flap associated with the SCTG. The frenectomy (figure 2) was

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[II] Proderma Farmácia de Manipulação Ltda, Piracicaba, SP, Brazil.

[¶] Lidocaina - Alphacaina, adrenalina 1:100.000, DFL Ind. e Com. Ltda, Rio de Janeiro, RJ, Brazil.

[#] Hu-Friedy, Chicago, IL, USA.

accomplished to eliminate the muscular attachment in the gingival margin and minimize the disruption of blood supply. Tree weeks later (figure 3), the gingival tissues adjacent to the recessions were regarded mature to be included in the definitive surgical procedure to achieve root coverage. Allen and Miller[30] previously described the procedure. Briefly, two horizontal incisions were accomplished mesially and distally to the defect at the level of the cemento-enamel junction (CEJ) towards the CEJ of the neighboring teeth. Vertical divergent relaxing incisions were done starting from the mid-distance of the horizontal incisions and were extended apically beyond the mucogingival junction (MGJ). An intrasulcular incision complemented the flap design. The trapezoidal partial-thickness flap was raised using sharp dissection, apically and laterally extended as far as necessary to allow the flap coronally reposition at the CEJ without tension. The vestibular epithelium of the interdental papillae was excised to provide a proper wound bed for healing.

The SCTG was harvested from the palatal area between the canine and first molar 2.0 to 3.0 mm away from the gingival margin. One horizontal and two vertical incisions outlined the partial-thickness trap door flap underneath the SCTG was removed. The graft was shaped and trimmed to fit the recipient site at the level of the CEJ, completely covering the defect and adjacent connective bed. Absorbable 6.0 sutures ** were used to immobilize the graft in place (figure 4). The flap was coronally placed at level of CEJ completely covering the SCTG. Non-absorbable

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** Poliglactina 910 vicryl, Ethicon, Johnson & Johnson Prod. Prof. Ltda, São José dos Campos, SP, Brazil.

6.0 sutures [††] were used interproximally and at the vertical incisions to immobilize the flap (figure 5). The donor site was sutured using the 6.0 vicryl suture material.

Both the recipient and donor sites healed uneventfully. There was complete root coverage, the probing depth did not exceed 2.0 mm and the keratinized tissue width increased to 4.0 to 5.0 mm (figure 6).

SITUATION NUMBER TWO

Aesthetic concerns are presented in two different cases. First, a 45-year-old female with multiple recessions compromising teeth 11, 12 and 13. The defects ranged from 2.0 – 4.0 mm associated with a small band of keratinized tissue apical to the gingival margin (figure 7). The treatment of choice was a modification of the technique proposed by Bruno [68], in which a split-thickness envelope flap is outlined with intrasulcular incisions linked with horizontal incisions at the level of the CEJ, the interdental papillae epithelium was removed and no vertical incisions were performed (figure 8). The SCTG was obtained and fixed in position to cover the defects. The flap was coronally positioned and immobilized with proximal sutures (figure 9).

Second, a 26-year-old female reporting aesthetic concerns and root hypersensitivity regarding tooth number 14. The tooth was associated with root abrasion lesion, slight buccal over projection, the keratinized tissue width was 3.0 mm and recession depth amounted about 4.0 mm (figure 11). In this case the

[††] Nylon monofilament, Ethicon, Johnson & Johnson Prod. Prof. Ltda, São José dos Campos, SP, Brazil.

envelope was obtained by intrasulcular incisions including the interdental papillae neighboring the defect. No horizontal or vertical incisions were performed. A split-thickness flap was elevated with sharp dissection beyond the MGJ until no tension was felt during coronal position of the flap (figure 12). The connective tissue graft was harvested as described previously, placed over the recession and sutured with interproximal absorbable material (6.0 vicryl) (figure 13). The flap was positioned coronally as possible and sutured with two interrupted proximal and one mattress technique tightened in the palatal aspect using non-resorbable material (6.0 nylon monofilaments). Part of the SCTG was left uncovered (figure 14). There was complete root coverage in both cases and resolution of both esthetic concerns and cervical hypersensitivity (figures 10 and 15).

SITUATION NUMBER THREE

A 26-year-old female with retained deciduous tooth number 85 due to agenesis were referred to mucogingival surgery. The recession was about 3.0 mm deep in the mesial root and 1.0 mm in the distal root, there was no attached gingiva in the mesial aspect of the tooth and about 3.0 mm distally (figure 16). The coronally positioned flap associated with the SCTG was the treatment of choice, previously described in the resolution of the situation 2. Following the split-thickness flap elevation, the connective graft was fixed and immobilized with proximal sutures using 6.0 nylon monofilaments (figure 17). The flap was coronally positioned at the level of the CEJ using the same suture material (figure 18). Healing was uneventful

resulting in complete root coverage and increase of the width and thickness of gingival tissues (figure 19).

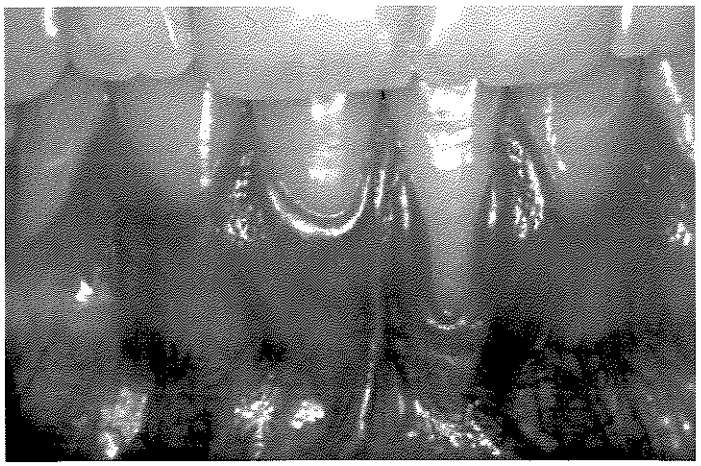

Figure 1: recession defect associated with frenum attachment

Figure 2: frenectomy accomplished

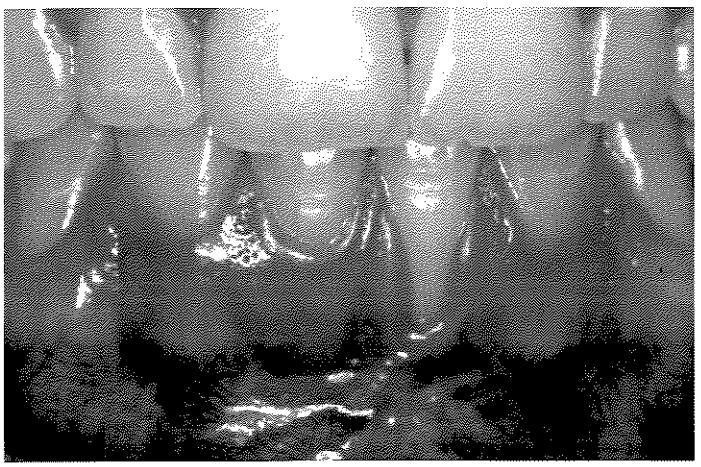

Figure 3: three weeks after frenectomy

Figure 4: split-thickness flap raised and SCTG sutured in place

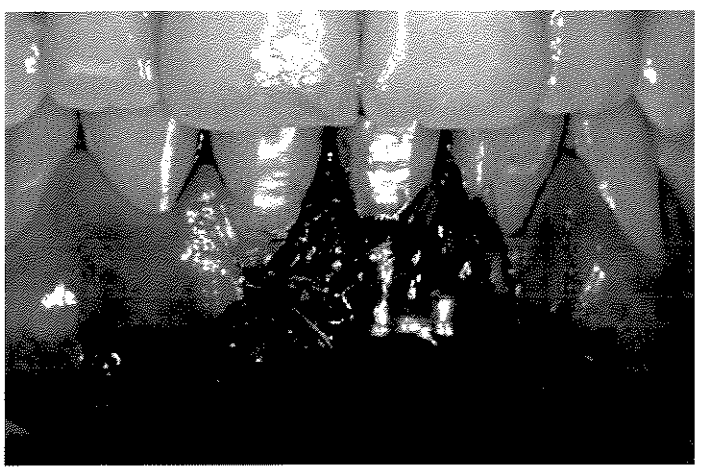

Figure 5: flap coronally positioned over the SCTG at the level of CEJ

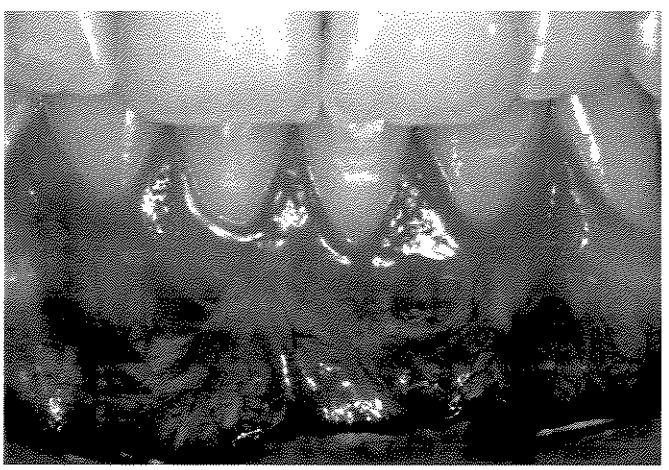

Figure 6: three months follow-up showing complete root coverage

Figure 7: pre-surgical view of the recessions

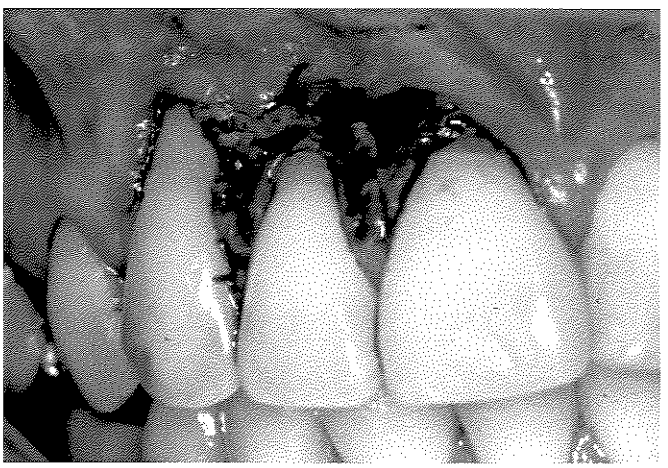

Figure 8: partial-thickness flap elevation. Observe papillae de-epithelization

Figure 9: coronally positioned flap covering the SCTG

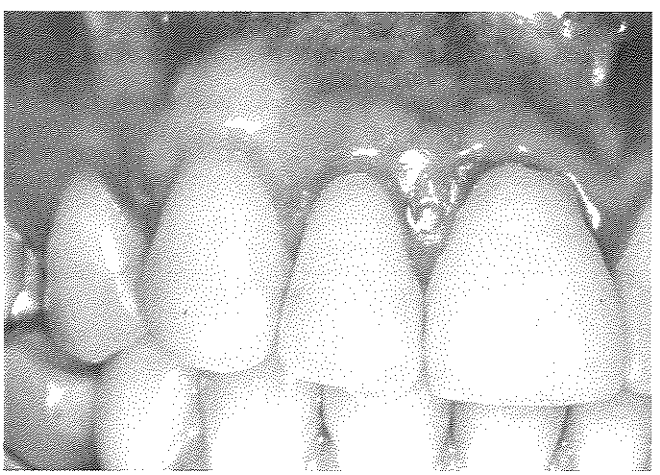

Figure 10: three months follow-up. Complete root coverage was observed

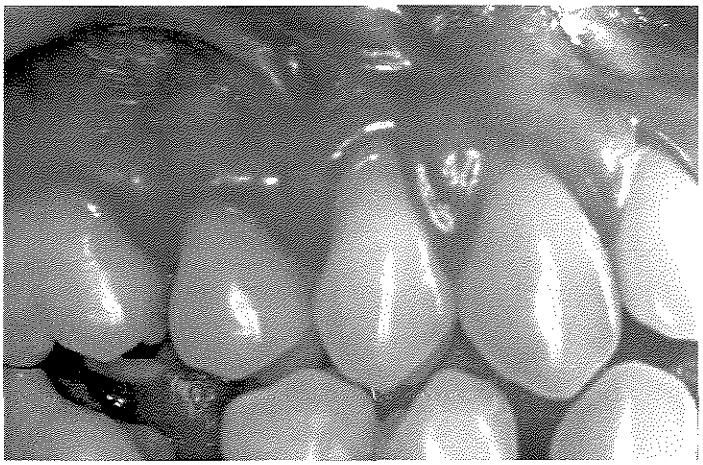

Figure 11: recession associated with abrasion lesion

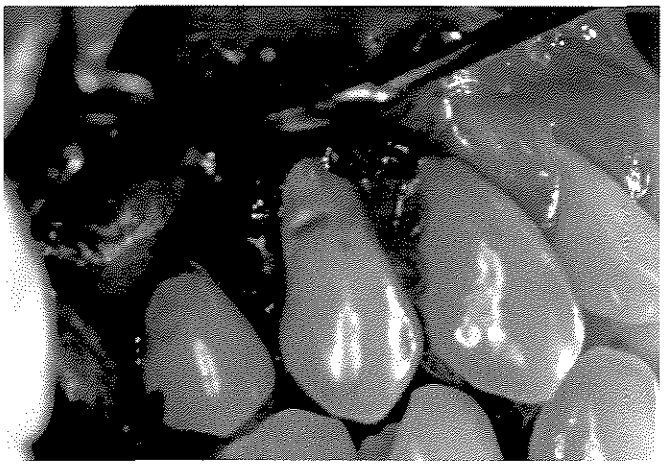

Figure 12: partial-thickness flap including the interdental papillae

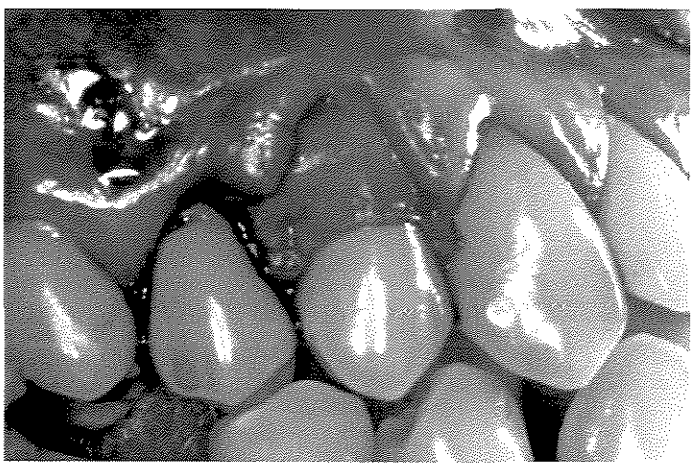

Figure 13: SCTG suture at the level of the CEJ

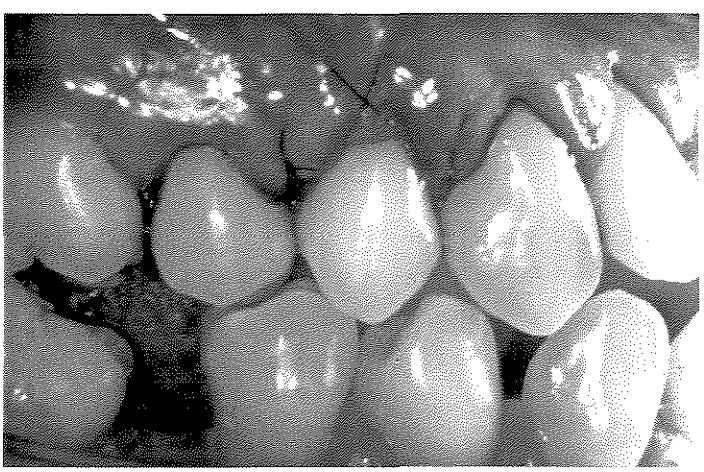

Figure 14: flap coronally positioned over the SCTG. Note partial graft exposure

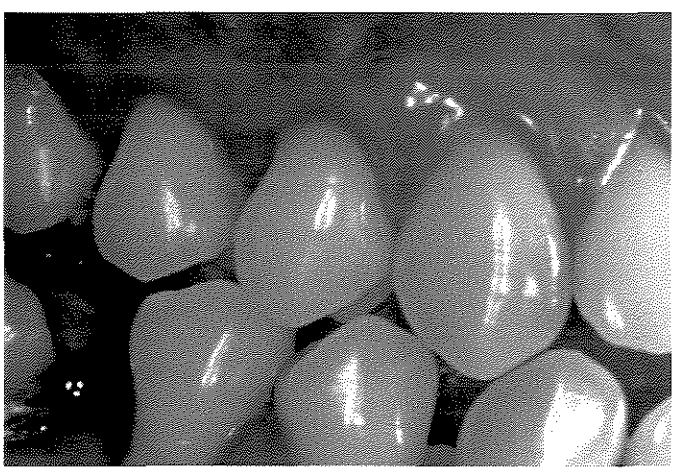

Figure 15: three month follow-up showing complete root coverage

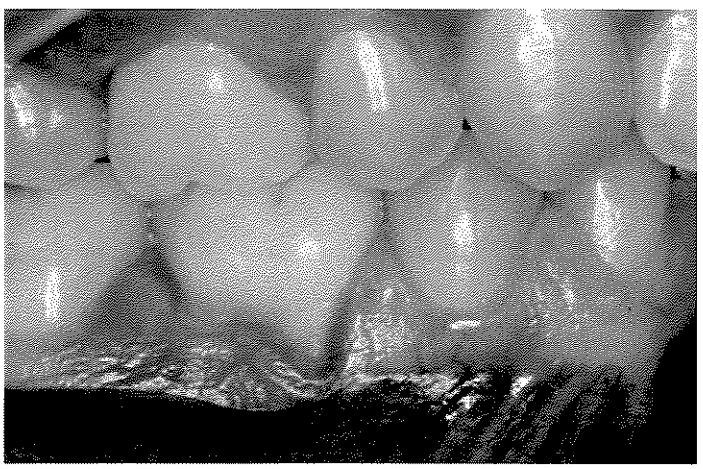

Figure 16: deciduous tooth number 85

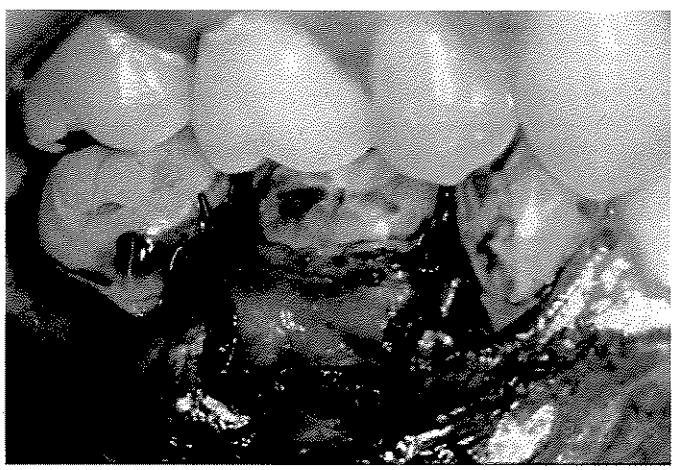

Figure 17: SCTG sutured in place

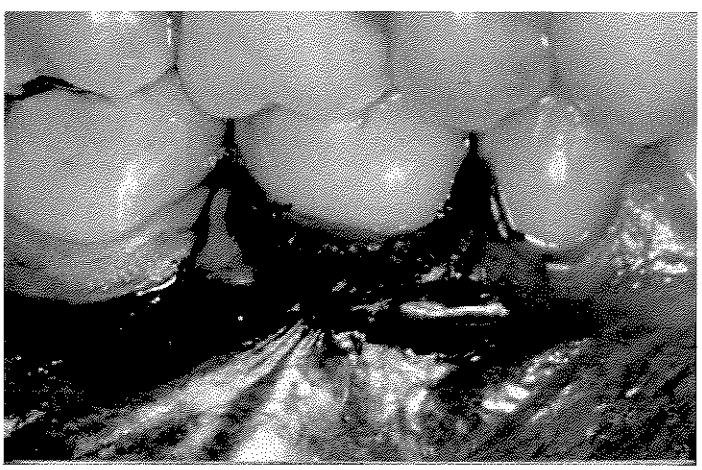

Figure 18: coronally positioned flap

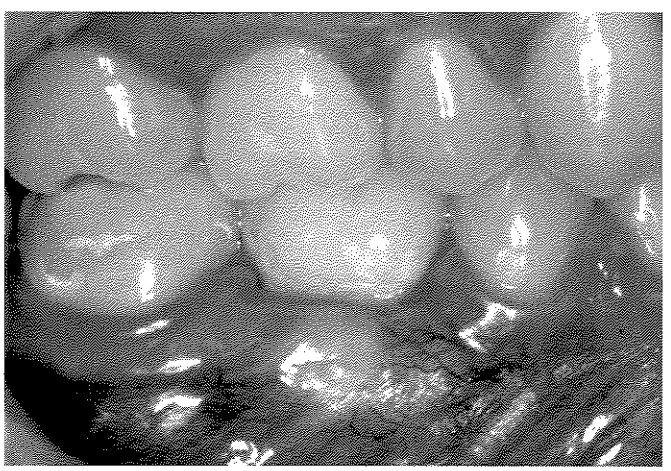

Figure 19: three months follow-up showing complete root coverage

DISCUSSION

This manuscript was conducted to clinically prove the suitability of the SCTG associated with advanced split-thickness flaps to resolve gingival recessions. Since Langer & Langer[50] introduced the concept of using the SCTG to improve the predictability of root coverage procedures, several variants have been proposed, using partial-thickness and mucoperiosteal flaps, with and without vertical relaxing incisions.[48,60] For all these approaches, the expected percentage of mean root coverage ranges from 52% to 98%, and complete root coverage averages 66%.[60] Overall, the increase of the predictability of bilaminar techniques associated with the SCTG is due to the creation of favorable biologic environment in which there is a double blood supply for nourishment of the graft, from the gingival flap facially and the overlaying periosteum on the opposite side. Other advantages of the approach includes reduced discomfort of the donor site due to the possibility of suturing, improved esthetics with more consistent color blending, good gingival contour and less likelihood of keloid formation.

Complete root coverage includes: the soft tissue margin must be located at the CEJ; there is clinical attachment to the root; the sulcus depth is no more than 2.0 mm; and there is no bleeding on probing.[62]

In our study we used different approaches of coronally advancing the flap in association with the SCTG addressing different clinical situations (figures 1, 7, 11 and 16). After the procedure we obtained complete root coverage, increased width and thickness of the gingivae, probing depths not exceeding 2.0 mm and no signs of gingival inflammation (figures 5, 10, 15 and 19). According to the "peak theory"

proposed by Miller[20] the predictability of root coverage procedures requiring flap mobilization and use of free soft grafts relies on the collateral blood supply from the periosteum bed and interproximal bone that guarantees the vitality of soft tissues. In the absence of interproximal bone there is no reliable source of blood supply; therefore, root coverage using the SCTG can only be expected at the level of the adjacent interproximal tissue. The treatment of gingival recessions is required for aesthetics and functional reasons. The esthetic concept is subjective but is related to harmony and symmetry of structures. The presence of longer teeth is a major patients' complaint and reason for them to seek treatment. However, functional problems may also dictate indication of root coverage. Frenum pull associated with recession is a clinical challenge not only for esthetic reasons, but more importantly because the muscular attachment represents a physical barrier that inhibits the individual to promote self-plaque-control. These areas are constantly inflamed and are prone to more attachment loss. We presented one case in which the defect was completely covered reestablishing proper conditions for plaque control (figures 1 to 6). Frequently in these situations, there is little or no attached gingiva associated with the gingival defect. Further, root hypersensitivity and radicular grooves and abrasion lesions could impair proper self-plaque control contributing for the establishment of gingival inflammation. Thus, recession defects associated with muscular attachment, root hypersensitivity and radicular abrasion lesions constitutes into a functional problem. After the root coverage procedures there was a dramatic keratinized tissue increase, resembling the adjacent areas. Thus, it

might be that the absence of keratinized tissue is a consequence rather than a causing agent of the recession etiopathogenesis.

The envelope procedure to treat the defects showed in figures 8, 12 and 17 was effective to produce root coverage in single or multiple sites. In the same way, the placement of vertical incisions (figure 4) did not interfere with the clinical outcomes. It is difficult, however, to make further comparisons of the surgical techniques presented in this series case study because of the limited number of treated sites. The elimination of the vertical incisions targets to avoid interrupting tissues nourishment, promote more rapid healing and to prevent cicatricial lines.

In this clinical presentation we intentionally promoted intensive root scaling until a flattened surface was achieved in all cases, except one recession reported in figure 11 where the defect was associated with an abrasion cavity due to excessive force during toothbrushing. The aim of scaling and root planing is to produce root detoxification, reduce the area to be covered, remove radicular irregularities, grooves and decays.[60,63,64] Complete root coverage was achieved in all clinical situations irrespective of the intentional root flattening. Our results are in accordance with those by Pini-Prato et al.[65] who concluded in their study using the coronally positioned flap that mechanical instrumentation does not seem necessary in the treatment of shallow defects.

Gingival recession in deciduous teeth is a not common clinical situation, especially when the deciduous tooth is retained within the permanent dentition. In this study (figure 16) the final clinical outcome obtained in the molar deciduous tooth (figure 19) was as good as the results obtained in permanent teeth. We can

assume that the subepithelial connective tissue graft is effective irrespective of the tooth to be treated, however, morphological differences between deciduous and permanent teeth should be considered before the surgery. The dimensions of the deciduous tooth are smaller than those of the permanent tooth, and this might interfere with the distance between CEJ and interproximal bone.

Despite that we are presenting the results of root coverage after a short period of time, there is sufficient evidences in the literature to support the concept that the results achieved are long-term stable if atraumatic plaque control is maintained. [51,66,68] Within the limits of this study we can conclude that the SCTG associated with advanced flaps result in predictable root coverage resolving aesthetic and functional problems in single or multiple defects.

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CONCLUSÃO GERAL

Os resultados dos estudos apresentados sugerem que o retalho colocado coronal associado ou não ao enxerto de tecido conjuntivo subepitelial é eficiente em promover recobrimento radicular.

A técnica associada deveria ser utilizada se o objetivo clínico incluir o aumento da espessura da margem gengival.

O retalho colocado coronal associado ao enxerto de tecido conjuntivo subepitelial se mostrou previsível e eficiente na resolução de problemas estéticos e funcionais.

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APÊNDICE

Parâmetros Clínicos para cada paciente no exame inicial.

	Exame Inicial											
	RCC+ETCS						RCC					
Paciente	PS	NMG	NCI	TQ	EG1	EG2	PS	NMG	NCI	TQ	EG1	EG2
1	1.8	4.8	6.6	3.0	1.1	0.9	1.0	4.6	5.6	3.6	1.1	0.9
2	1.2	4.0	5.2	3.0	1.2	1.1	1.6	4.2	5.8	2.6	1.3	0.8
3	1.8	3.0	4.8	3.2	1.6	1.1	1.2	3.8	5.0	2.0	1.2	1.1
4	0.8	3.0	3.8	2.0	1.1	1.4	0.8	3.4	4.2	2.0	1.7	1.4
5	1.0	3.8	4.8	4.4	1.8	1.2	1.2	4.0	5.2	5.4	1.9	1.0
6	1.6	3.6	5.2	1.2	1.0	1.5	1.6	4.4	6.0	2.2	1.0	1.4
7	1.8	4.2	6.0	3.6	1.1	0.8	2.0	3.0	5.0	6.4	1.2	1.2
8	1.6	5.0	6.6	1.8	1.3	0.8	2.2	4.4	6.6	5.0	1.2	1.1
9	1.8	5.0	6.8	3.2	1.8	1.5	1.2	4.8	6.0	2.8	1.4	1.5
10	1.6	4.8	6.4	3.3	1.4	1.5	1.4	3.0	4.4	2.8	1.0	0.8
11	1.4	5.0	5.4	2.0	1.4	0.9	2.0	4.2	6.2	2.4	1.0	0.7
Média	1.49	4.20	5.60	2.79	1.34	1.15	1.47	3.98	5.45	3.38	1.27	1.08
D.P.	0.35	0.78	0.95	0.93	0.28	0.28	0.45	0.62	0.76	1.53	0.29	0.27

RCC+ETCS: retalho colocado coronal associado ao enxerto de tecido conjuntivo subepitelial.

RCC: retalho colocado coronal.

PS: profundidade de sondagem.

NMG: nível da margem gengival.

NCI: nível clínico de inserção.

TQ: faixa de tecido queratinizado.

EG1: espessura gengival 1.

EG2: espessura gengival 2.

Parâmetros Clínicos para cada paciente no exame final.

	6 meses											
	RCC+ETCS						RCC					
Paciente	PS	NMG	NCI	TQ	EG1	EG2	PS	NMG	NCI	TQ	EG1	EG2
1	1.8	0.0	1.8	3.8	1.8	2.5	1.4	0.0	1.4	4.2	1.4	1.7
2	1.6	0.4	2.0	2.9	1.8	1.9	1.6	0.4	2.0	1.8	1.1	1.9
3	1.2	0.8	2.0	2.7	1.2	1.9	1.9	2.0	3.9	2.2	1.1	1.0
4	2.0	1.0	3.0	2.4	1.7	1.6	1.8	1.0	2.8	2.0	1.4	0.9
5	1.8	1.8	3.6	4.8	2.0	2.4	1.4	1.0	2.4	5.0	1.3	1.4
6	2.4	0.0	2.4	2.8	1.8	2.0	2.2	2.2	4.4	2.8	1.4	1.4
7	3.0	1.4	4.4	3.4	1.8	1.8	1.6	2.0	3.6	4.8	1.1	1.2
8	2.6	1.8	4.4	4.2	2.0	2.0	3.0	1.4	4.4	4.6	1.7	1.7
9	2.4	1.6	4.0	3.0	2.3	2.3	2.1	1.8	4.0	2.8	1.5	1.1
10	1.8	1.0	2.8	3.4	1.8	2.0	1.8	1.0	2.8	2.6	1.1	1.0
11	1.8	1.6	3.4	3.4	1.4	1.2	2.0	1.0	3.0	2.1	1.0	1.0
Média	2.04	1.04	3.07	3.35	1.78	1.96	1.89	1.25	3.15	3.17	1.28	1.30
D.P.	0.51	0.67	0.96	0.71	0.29	0.37	0.45	0.70	0.99	1.23	0.22	0.34

RCC+ETCS: retalho colocado coronal associado ao enxerto de tecido conjuntivo subepitelial.

RCC: retalho colocado coronal.

PS: profundidade de sondagem.

NMG: nível da margem gengival.

NCI: nível clínico de inserção.

TQ: faixa de tecido queratinizado.

EG1: espessura gengival 1.

EG2: espessura gengival 2.

Percentual de recobrimento radicular

Paciente	RCC+ETCS	RCC
1	100	100
2	90	90.47
3	73.33	47.36
4	66.66	70.58
5	52.63	75
6	100	50
7	66.66	33.33
8	64	68.18
9	68	79.16
10	79.16	66.66
11	68	79.19
Média ± D.P.	75.31 ± 15.34	68.81 ± 19.29
Recobrimento total	18.18	9.09

RCC+ETCS: retalho colocado coronal associado ao enxerto de tecido conjuntivo subepitelial.

RCC: retalho colocado coronal.

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

As informações dispostas neste termo foram fornecidas por Robert Carvalho da Silva (Mestrando em Clínica Odontológica na Área de Periodontia e executor do projeto) e Prof. Antonio Fernando Martorelli de Lima (Orientador), objetivando firmar acordo formal por escrito, mediante o qual o indivíduo objeto da pesquisa autoriza sua participação, com pleno conhecimento da natureza dos procedimentos e riscos a que se submeterá, com a capacidade de livre arbítrio e sem qualquer coação.

I - Título do projeto de pesquisa:

"RECOBRIMENTO RADICULAR EM ÁREAS ESTÉTICAS E FUNCIONAIS"

II – Objetivo

O objetivo deste estudo é comparar o resultado do tratamento de recessões gengivais classe I e II de Miller utilizando a técnica de retalho recolocado coronal associado ou não ao enxerto sub-epitelial de tecido conjuntivo.

III - Justificativa:

Os conceitos de estética estão cada vez mais valorizados pela população, a odontologia, e a periodontia, não foge deste contexto. As recessões gengivais representam situações clínicas extremamente freqüentes e de grande interesse da

população que procura o atendimento odontológico com vistas às considerações estéticas.

A resolução das recessões gengivais, de etiologia associada à inflamação por escovação traumática e/ou induzida pelo biofilme dental, é alcançada através de abordagens cirúrgicas apartir de enxertos gengivais livres, epitelizados ou não, e de enxertos pediculados, como o retalho recolocado coranariamente.

IV - Procedimentos clínicos:

Pacientes com recessões gengivais bilaterais em caninos ou pré-molares superiores serão aleatoriamente divididos em sítios teste, tratados com retalho recolocado coronário associado ao enxerto sub-epitelial de conjuntivo, e controle, tratados com retalho recolocado coronário isoladamente. Os pacientes serão submetidos dois meses antes do procedimento experimental ao tratamento periodontal inicial. No exame inicial serão determinados os índices dicotômicos de placa, gengival e de sangramento à sondagem. Utilizando o sistema computadorizado de sondagem Florida Probe® serão determinados os parâmetros biométricos profundidade de sondagem, nível clínico de inserção e nível da margem gengival. A quantidade e espessura da gengiva queratinizada será medida com paquímetro. Esses dados serão novamente obtidos no exame final, seis meses após o procedimento experimental.

V - Desconforto ou risco esperados

O procedimento experimental proposto pode ocasionar leve desconforto pós-operatório sendo facilmente suportado com terapia analgésica. A medicação pós-operatória proposta, antinflamatórios esteroidais, associada à explicação detalhada da conduta do paciente durante o período pós- operatório diminuem consideravelmente o risco de qualquer desconforto.

VI – Benefícios esperados:

Espera-se que as recessões gengivais sejam recobertas o máximo possível em ambos os grupos experimentais, reabilitando os voluntários da pesquisa do ponto de vista estético. Além disso, os voluntários receberão tratamento periodontal inicial com instrução de higiene oral, eliminação dos sinais clínicos de inflamação gengival, remoção dos fatores retentivos de placa e encaminhamento apropriado para a resolução de outros problemas odontológicos diagnosticados.

VII – Métodos alternativos existentes:

Considerando que os dentes estejam na posição correta nos arcos maxilar e mandibular, não existem outras alternativas que não as cirúrgicas para a resolução das retrações gengivais.

Alguns indivíduos rejeitam a hipótese da remoção de enxerto de tecido conjuntivo do palato. Nesta situação, os enxertos aloplásticos liofilizados oriundos de bancos de tecidos poderiam ser utilizados. Entretanto, existe mínimo risco de transmissão de doenças a despeito de todos os cuidados na obtenção e padronização do processamento do material.

VIII – Forma de acompanhamento e assistência:

Após os procedimentos experimentais, os pacientes receberão acompanhamento semanal durante as seis semanas subsequentes, e mensal até o período do novo exame sob a responsabilidade do executor deste projeto (Robert Carvalho da Silva).

IX – Direitos dos voluntários:

Todos os voluntários têm garantido o seu direito de receber todos os esclarecimentos sobre a metodologia a ser empregada, antes e durante o curso do projeto. Além disso, todos os voluntários têm plena liberdade de recusa de participação ou de retirada do consentimento, em qualquer fase da pesquisa, sem penalização alguma e sem prejuízo ao seu cuidado. Os dados coletados e as informações pessoais são confidenciais para assegurar a privacidade dos participantes.

X – Ressarcimento de despesas e formas de indenização:

Não haverá ônus material ou financeiro para os pacientes, portanto, não será necessário nenhum ressarcimento de despesa. No caso de eventuais danos decorrentes da pesquisa, as formas de indenização serão definidas judicialmente no foro local, de acordo com a legislação vigente.

XI – Consentimento formal para participação em pesquisa clínica:

Por este instrumento particular declaro, para os efeitos éticos e legais, que eu,_____(nome) ,_____(nacionalidade),_____ (profissão), portador do RG _____, e do CIC _____, residente e domiciliado à_____, na cidade de _____, tenho com absoluta consciência dos procedimentos a que vou me submeter para tratamento das recessões gengivais em meus dentes nos termos relacionados nas disposições anteriores. Esclareço ainda que este consentimento não exime a responsabilidade do profissional que executará os procedimentos experimentais.

Por estar de acordo com o teor do presente termo, assino abaixo o mesmo.

Piracicaba, ___ de _____ de _____.

_____

Assinatura do voluntário

_____

Assinatura do pesquisador

UNICAMP

COMITÊ DE ÉTICA EM PESQUISA

UNIVERSIDADE ESTADUAL DE CAMPINAS

FACULDADE DE ODONTOLOGIA DE PIRACICABA

CERTIFICADO

Certificamos que o Projeto de pesquisa intitulado "Recobrimento radicular com retalho recolocado coronário associado ou não à enxerto sub-epitelial de conjuntivo", sob o protocolo nº **142/2001**, do Pesquisador ***Robert Carvalho da Silva***, sob a responsabilidade do Prof. Dr. **Antônio Fernando Martorelli de Lima**, está de acordo com a Resolução 196/96 do Conselho Nacional de Saúde/MS, de 10/10/96, tendo sido aprovado pelo Comitê de Ética em Pesquisa – FOP.

Piracicaba, 05 de março de 2002

We certify that the research project with title "Root coverage with coronally repositioned flap associated or not to sub epithelial connective tissue graft", protocol nº **142/2001,** by Researcher ***Robert Carvalho da Silva***, responsibility by Prof. Dr. **Antônio Fernando Martorelli de Lima**, is in agreement with the Resolution 196/96 from National Committee of Health/Health Department (BR) and was approved by the Ethical Committee in Resarch at the Piracicaba Dentistry School/UNICAMP (State University of Campinas).

Piracicaba, SP, Brazil, March 05 2002

Prof. Dr. Pedro Luiz Rosalen
Secretário
CEP/FOP/UNICAMP

Prof. Dr. Antonio Bento Alves de Moraes
Coordenador
CEP/FOP/UNICAMP